Feb. 9, 1943. H. D. LEARNARD ET AL 2,310,245

FABRIC TREATMENT

Filed June 14, 1940 2 Sheets-Sheet 1

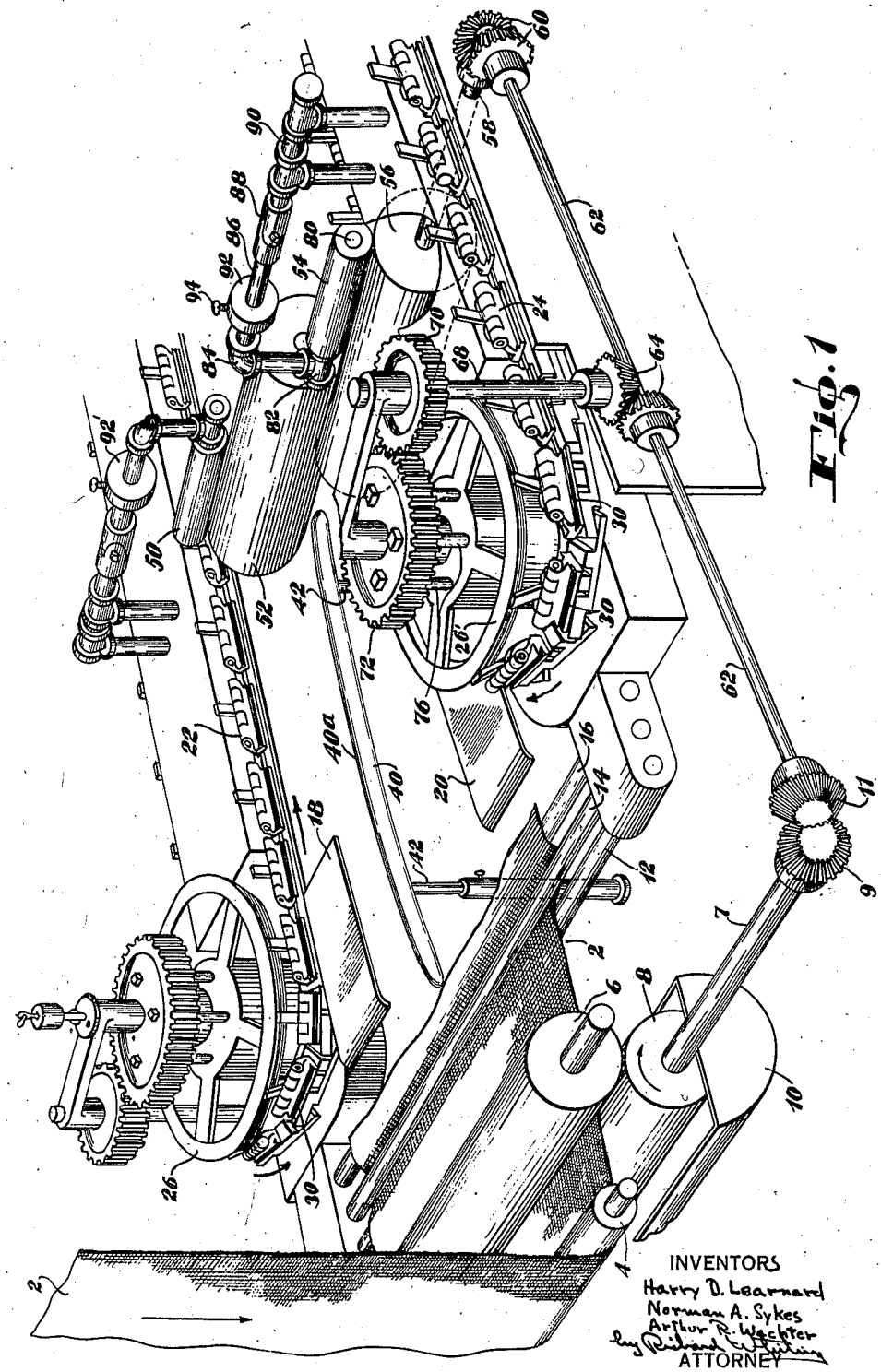


Fig. 1

INVENTORS
Harry D. Learnard
Norman A. Sykes
Arthur R. Wachter
by Richard R. Watkins
ATTORNEY

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Filed June 14, 1940 2 Sheets-Sheet 2

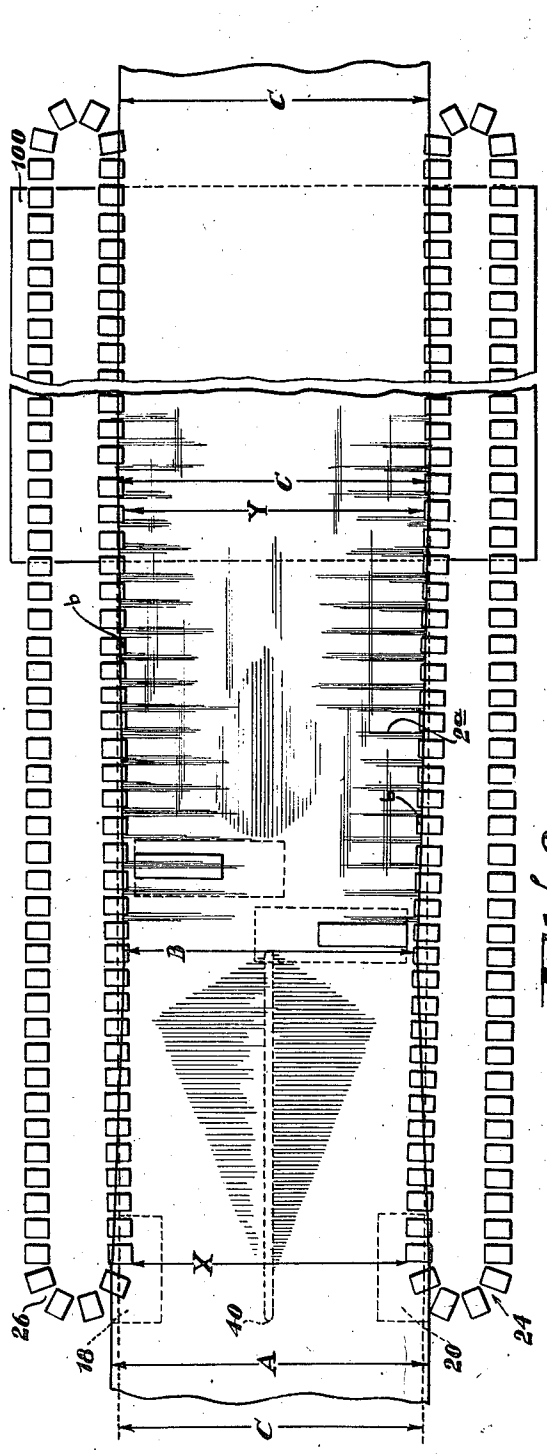


Fig. 2

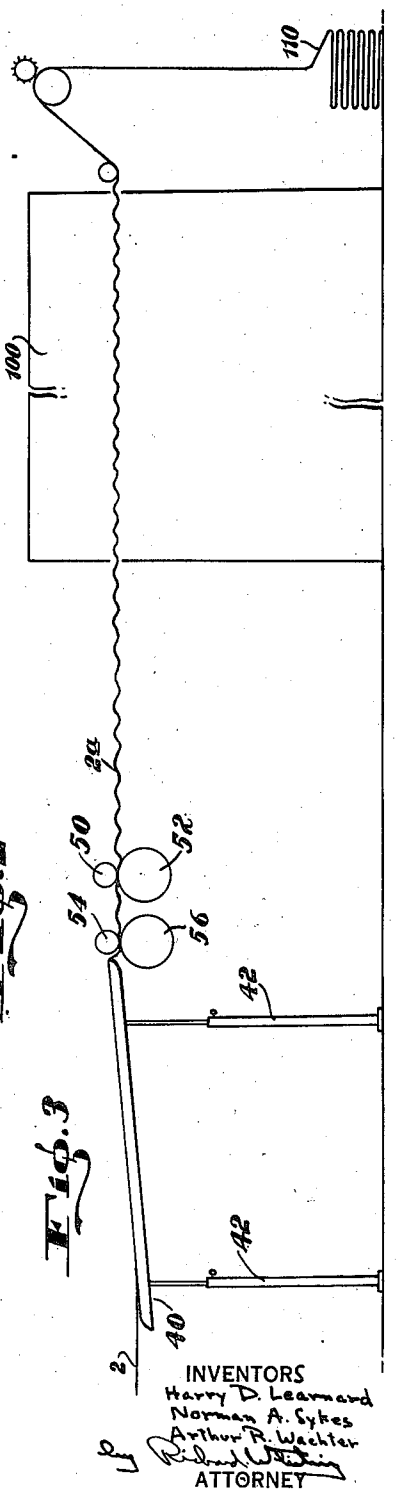


Fig. 3

INVENTORS
Harry D. Learnard
Norman A. Sykes
Arthur R. Wechter
ATTORNEY

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FABRIC TREATMENT

Harry D. Learnard, Andover, Norman A. Sykes, Methuen, and Arthur R. Wachter, Reading, Mass., assignors to Pacific Mills, Lawrence, Mass., a corporation of Massachusetts

Application June 14, 1940, Serial No. 340,625

5 Claims. (Cl. 26—60)

This invention relates to a treatment for imparting a uniform width to fabrics and its object is to provide improved method and apparatus which utilize for that purpose the natural weftwise shrinkage of the fabric due to wetting and drying. In accordance with the preferred embodiment of this invention a warpwise and a predetermined amount of weftwise slack is introduced to the fabric in a novel way to control the amount of shrinkage during drying so that a uniform width and a warpwise and weftwise preshrinkage are attained.

In the drawings:

Fig. 1 is a perspective view of a machine embodying the invention, viewed from the entering end;

Fig. 2 is a plan view diagrammatically illustrating the treatment, and

Fig. 3 is a diagrammatic elevation view of the elements of Fig. 2.

Referring first to Fig. 1, the web 2 of fabric entering the machine passes around guide roll 4 and between rolls 6 and 8, the lower of which dips into a tank 10 containing water or other liquid customarily employed in width finishing. The shaft 7 of roll 8 is power driven through bevel gears 9 and 11 from shaft 62, rotated in a manner to be described. From the tank 10 the web passes around rods 12, 14 and 16 suitably mounted in the frame and adapted to flatten and guide the web. The web then advances substantially horizontally until its selvages are supported on platforms 18 and 20 where they are engaged by side conveyors 22 and 24 adapted to grasp the selvages and convey the fabric through a dryer as will be described. The conveyors 22 and 24 may be of any desired construction and the conventional opposed chains of clip tenters have been used effectively for this purpose. As the particular form of conveyor forms no part of the present invention provided it operates in the manner described below and as the construction of a clip tenter chain is well known in the art, it need not be further described.

The tenter chain 22 approaches the inlet end of the machine, rounds the usual opening wheel 26 and returns in fabric feeding position along suitable guides, it being driven by conventional apparatus not shown, but which includes means for rotating the wheel 26. In a similar fashion, chain 24 approaches and leaves the entering end of the machine around the opening wheel 26'. As the clips round the wheels 26 and 26' their jaws are opened, as indicated at 30, to receive the fabric selvages on which they converge over the platforms 18 and 20. As in the usual clip tenter, the jaws close automatically when the fabric, initially inserted fully into the clips, is withdrawn to a predetermined position in the outer margins of their open mouths.

At 40 is designated a novel weftwise slack introducing member in the form of a pole mounted at opposite ends on legs 42 suitably adapted, as by being constructed of telescoping sections, for adjustment of the height of the upper edge 40a of the pole above the plane of the platforms 18 and 20 supporting the selvages of the fabric. Preferably, the member 40 extends substantially midway of and parallel to the direction of web travel. The member 40 is so disposed that its web engaging edge 40a gradually slants upwardly to elevate the center of the web above the plane of its selvages pulling the selvages outwardly of the still open mouths of the tender clips, so that as the web passes beyond the reach of member 40 it has a predetermined amount of weftwise slack.

At or adjacent the leaving end of the member 40 are a pair of warpwise slack introducing members consisting of upper and lower rolls 50 and 52 on the left hand side of the machine and 54 and 56 on the right hand side. The roll 56, preferably cloth covered, is mounted horizontally on a shaft 58 connected by bevel gears 60 to shaft 62 driven by bevel gears 64 from a vertical shaft 68 driven by gear 70 meshing with gear 72 secured to power driven wheel 26' as by bolts 76. By this means roll 56, as well as the aforesaid roll 8, being geared to the drive for the tenter chain 24, rotate at a predetermined peripheral speed with relation to the speed of advance of the chain. As will be described, the speeds of rolls 8 and 56 are preferably the same and are slightly greater than the speed of the chain.

The roll 54 rests on the periphery of the roll 56. It is mounted on a shaft 80 supported at one end in a bearing 82 rigidly suspended at 84 from a shaft 86 pivotally mounted at 88 to a standard 90 suitably supported on the frame. The shaft 86 receives a weight 92 which can slide lengthwise of the shaft and be secured in adjusted position by the thumb screw 94. By changing the position of weight 92 toward and away from the pivot point 88, the amount of pressure of roll 54 against roll 56 can be adjusted.

In similar manner, roll 52 is driven from the drive for chain 22 to rotate at a predetermined peripheral speed relative to the speed of ad-

vance of the chain, and in practice rolls 52, 56 and 8 rotate at the same peripheral speed. Also, in like manner, pressure roll 50 rests in peripheral engagement with roll 52 to press thereagainst with an adjustable pressure regulated by the position of weight 92'.

After the clips close on the selvages in a manner to be described, the tenters convey the fabric through a hot air drier 100 where it is exposed to circulating currents of air heated to a temperature of approximately 250° F. to 350° F. The drier is preferably long enough with relation to the speed of the fabric to dry the fabric completely before it is accumulated at 110.

The operation of the machine is as follows: As the fabric enters the machine it is of uneven width due largely to varying amounts of warpwise tension applied to it in drawing it through the preceding operations of dyeing, finishing, etc. in its manufacture. On rare occasions the web may have one or more scallops in its selvages as the result of a previous severe tensioning. Its approximate means width is indicated at A in Fig. 2. This width is slightly greater than the desired finished width indicated at C. For example, a web that is to finish 38" wide would be woven 40" wide and would reach the machine of the present invention at about 38½" to 39" means width depending upon its treatment after weaving.

The fabric is introduced to the machine between moisture-applying rolls 6 and 8 at the peripheral speed of rolls 8, 52 and 56. The selvages of the web are guided by the platforms 18 and 20 into the open jaws of the opposite tenter clips 22 and 24 moving in the directions shown by arrows.

While the jaws remain open the center of the web is pushed upwardly by the member 40 gradually contracting the selvages from their A width to their B width reached at the end of the member 40 so that as the web leaves the member 40 it is slack weftwise.

The fabric then passes between the rolls 52, 56 and their pressure rollers 50, 54 and as it leaves the rolls the tenter clips are closed on the selvages. The speed of the tenter chains is slightly lower than that of the fabric, preferably around 5% lower, with the result that as the cloth is grasped by the clips in closing it accumulates between the clips forming the transverse undulations indicated at 2*a*, the effect of which is to provide slack warpwise of the web.

The web which is now slack both warpwise and weftwise then enters the housing 100.

The tracks on which the opposite tenter chains run are so spaced apart that as the open clips receive the selvages of the web over the platforms 18 and 20 the clips are spaced a distance X, such that the selvages protrude deep into their mouths. The clip chains gradually and uniformly diverge from the width X to the width Y assumed immediately after they pass into the hot housing 100.

Each of the clips of the chains closes by the usual automatic devices when the selvage in the clip has been withdrawn until it protrudes into the clip a small predetermined distance *b*. Such withdrawal is effected partly by the member 40 which, in pushing the center of the web upwardly, draws the selvages inwardly to the position B, and partly by divergence of the clip chains between X and Y. Because of this outward chain divergence, the clips close automatically at different times governed by when the distance *b* is reached in each clip and varying with the uneven width of the cloth. The divergence is such that the clips preferably close on the narrowest portions, including any severe scallops that may be present, just after the warp slack has been introduced at rolls 52 and 56. Continued diverging movement of the clips toward the housing 100 causes more clips to close as they move outwardly on the wider portions of the web, until the point Y is reached when all of the clips will be closed. From then on the clips run parallel at the Y spacing holding the selvages parallel and spaced apart a distance C from each other. This distance is preferably equal to the desired finished width of the web.

The amount of weft slack introduced to the web by the member 40 is preferably such that the slack in the widest portions of the web will be taken up by weftwise shrinkage in the dryer 100. In the narrower portions of the web there will be less slack, since the clips in diverging after grasping the selvages at the narrower portions will take out some of the slack introduced to them by the member 40 and as a result of such lessened slack in the narrower portions the shrinkage will be less therein, thus finishing them to the same width as the initially wider portions which undergo a relatively greater amount of shrinkage.

The warpwise slack introduced by the difference in speed between the cloth fooding rools 52, 56 and 8 and the tenter chains enhances the ability of the fabric to shrink weftwise, since the warp slack removes such resistance to weftwise shrinking as would result from a straightened, taut warp. The fabric is also shrunk warpwise due to slack drying so that less yardage leaves the machine than enters it and the amount of this warpwise shrinkage is adjustable by varying the relative speeds of the clip chains and entering fabric.

By the present invention a simple yet effective treatment for width finishing has been provided which employs, with the exceptions above noted, conventional apparatus available in most mills. It is to be understood that except as indicated in the appended claims the invention is not to be limited to the details above described.

We claim:

1. The treatment of cloth to impart to it a substantially uniform predetermined width which consists in wetting a web of cloth that is wider than said predetermined width and has irregular selvage edges, advancing the moist web of cloth to feed its selvages with the open clips of two oppositely disposed series of moving tenter clips introducing weft slack into the web by engaging the web and withdrawing its selvages outwardly of the open clips, diverging the moving tenter clips to effect automatic closure on the opposite selvages of the fabric while the fabric is advancing faster than the clips so that the fabric accumulates between the clips to provide warp slack, subsequently disposing the opposite series of clips in parallel relationship spaced apart to dispose each edge of the fabric along a line parallel to the other edge and with the edges spaced apart a distance equal to said predetermined desired width of cloth, while retaining some of said weft slack, and thereafter shrinking the slacked cloth both warpwise and weftwise.

2. In apparatus for preshrinking cloth, the combination of two oppositely disposed series of tenter clips advancing at a predetermined rate of speed, means for opening the clips, feeding means for advancing cloth with its opposite selvages in

the open clips at a speed which is greater than that of the clips, means engaging the cloth for withdrawing its edges outwardly of the open mouths of the clips to introduce weft slack, means for closing the clips while the cloth is advancing at such relatively greater speed to introduce warp slack, means for aligning the clips to space the opposite selvage edges at a distance equal to the desired width and means for removing moisture from the cloth to effect shrinkage thereof.

3. The treatment of a web of fabric of uneven initial width to impart to it a substantially even width, which includes moistening the web, engaging the central portion of the web and holding it out of the plane of the selvage portions, grasping successive portions of each selvage, disposing the grasped portions of each selvage with their edges in alignment with each other and spaced a predetermined distance from the opposite selvage portions approximating the desired finished width, releasing said engaged portion of the web while the web is still moist to provide a weftwise slack varying in amount corresponding to the variations in the said initial width, and drying the fabric so slacked to contract it to the width desired.

4. The treatment of a web of fabric of uneven initial width to impart to it a substantially even width, which includes moistening the web, slacking the web warpwise, engaging the central portion of the web and holding it out of the plane of the selvage portions, grasping successive portions of each selvage, disposing the grasped portions of each selvage with their edges in alignment with each other and spaced a predetermined distance from the opposite selvage portions, releasing said engaged portion of the web to provide a weftwise slack varying in amount corresponding to the variations in the said initial width, and drying the fabric so slacked to shrink it warpwise and contract it weftwise to the width desired.

5. The treatment of a web of fabric of initial uneven width to impart to it a substantially even width, which includes advancing a moist web of cloth to feed its selvages within the open mouths of two oppositely disposed series of moving tenter clips, introducing weft slack into the web by engaging the web and drawing the selvages in a direction outwardly of the open clips, diverging the moving tenter clips to effect automatic closure on the opposite selvages of the fabric with the selvage edges protruding a uniform predetermined distance into the mouths of the clips, subsequently disposing the opposite series of clips along lines spaced a predetermined distance apart to align each edge of the fabric and provide a weftwise slack between the edges varying in amount corresponding to the variations in the said initial width, and thereafter drying the fabric so slacked to contract it to the width desired.

HARRY D. LEARNARD.
NORMAN A. SYKES.
ARTHUR R. WACHTER.

CERTIFICATE OF CORRECTION.

Patent No. 2,310,245. February 9, 1943.

HARRY D. LEARNARD, ET AL.

It is hereby certified that error appears in the printed specification of the above numbered patent requiring correction as follows: Page 2, first column, lines 23 and 29, for "means" read --mean--; and second column, line 30, for "fooding" read --feeding--; line 38, for "shrinkage" read --shrinking--; line 54, claim 1, for "with" read --within--; and that the said Letters Patent should be read with this correction therein that the same may conform to the record of the case in the Patent Office.

Signed and sealed this 30th day of March, A. D. 1943.

Henry Van Arsdale,
Acting Commissioner of Patents.

(Seal)